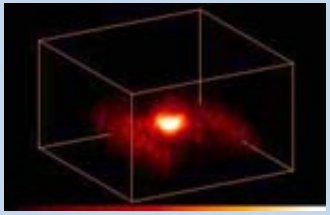
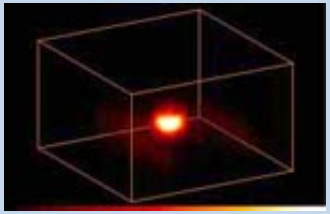
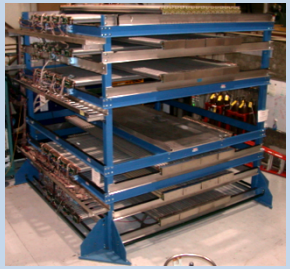
Nuclear Detection with Muons

Research

Large area detectors from nuclear physics were applied to measure the scattering of muons by nuclear materials or their shielding.







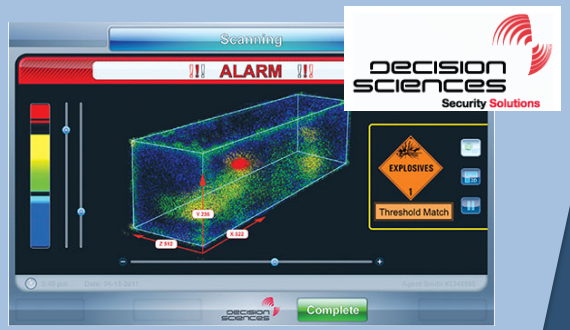
Using muon energies, as well as their deflections, produces radiographs that discriminate more precisely between materials.

Materials that most strongly deflect muons have high atomic numbers and high number densities.

Development

Simulation and experiment proved that cosmic ray muons can detect nuclear material in a background of normal cargo.

- Detects nuclear material with *no radiation hazard*
- CRADA with Decision Sciences implemented muon tomography in a detection system currently in use at the Freeport Container Port in the Bahamas
- Tested in the high background of the University of New Mexico research reactor



Mission Impact

Detecting shielded nuclear material is faster and safer than ever with muon tomography – fewer slow, costly, and dangerous manual inspections are needed.

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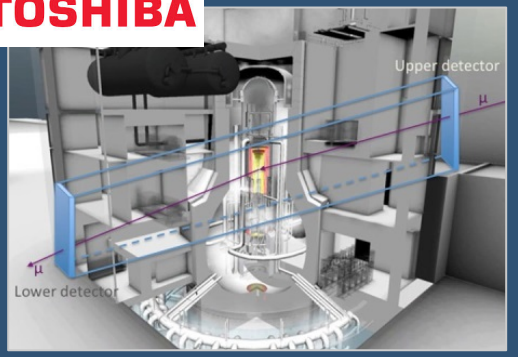

A system using muon detectors will determine the exact locations of the molten cores of the damaged Fukushima Daiichi reactors.